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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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12/31/2003

Peter A. Davison

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12/13/2006

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EXAMINER

EWALD, MARIA VERONICA

ART UNIT

PAPER NUMBER

1722

DATE MAILED: 12/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/750,534

Applicant(s)

DAVISON ET AL.

Examiner

Maria Veronica D. Ewald

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 October 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6,8,11,12 and 23-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6,8,11,12 and 23-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 October 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 11/15/06.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Claim Objections

13. Claim 2 is objected to because of the following informalities: As written, claim 2 states "...a layer of metal nitride deposited over the layer of metal nitride." Examiner is interpreting this phrase as "...a layer of metal nitride deposited over the layer of metal *oxide*." Examiner believes this is a misprint and requires correction and/or clarification so that claim 2 states "...a layer of metal nitride deposited over the layer of **metal oxide**." Applicant's reply filed October 10, 2006 states that the correction was made; however, the claim has not been changed.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by DePuydt, et al. (U.S. 6,030,556). DePuydt, et al. teach an apparatus comprising an embossing tool substrate made of a first metal, a first major surface of the substrate having an embossing profile (item 42 – figure 4; column 1, lines 15 – 20; column 7, lines 1 – 5); a first coating over the first major surface of the substrate, the first coating providing an adherable surface (column 7, lines 10 – 15); and a second coating over the first coating,

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the second coating providing a non-adhesive outer surface (column 7, lines 59 – 65); wherein the first coating is further comprised of three layers (a dielectric layer and a patterning layer comprised of two distinct layers), wherein there is a first layer of a second metal deposited over the embossing tool substrate (column 7, lines 28 – 31, 45 – 50); a subsequent layer over the base layer of second metal (column 5, lines 25 – 35, 58 – 60); and the third layer (column 5, lines 58 – 60). Furthermore, the second coating, also known as the cap coating or cap layer is provided to reduce or prevent disruptions to the planarity of the patterning material layers of the first coating (column 7, lines 60 – 65). DePuydt, et al. further teach that the layers of the individual layers depends on the desired pit depth in the discs to be stamped or formed (column 6, lines 60 – 65).

Claims 1 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Ohman, et al. (U.S. 6,454,970). Ohman, et al. an apparatus comprising an embossing tool substrate made of a first metal (item 7 – figure 14), a first major surface of the substrate having an embossing profile (column 12, lines 30 – 35); a first coating over the first major surface of the substrate, the first coating providing an adherable surface (item 41 – figure 14); and a second coating over the first coating, the second coating providing a non-adhesive outer surface (item 62 – figure 14); wherein the apparatus is further comprised of a heater apparatus and a pressure apparatus (column 9, lines 5 – 10; column 11, lines 8 – 12).

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Claim 23 is rejected under 35 U.S.C. 102(b) as being anticipated by Ohman, et al. Ohman, et al. teach an apparatus comprising: an embossing tool that includes: a tool substrate base (item 7 – figure 14); and means attached to the tool substrate base for providing a hardened embossing surface with reduced adherence properties to an embossable substrate (column 1, lines 5 – 15; column 19, lines 4 – 10, 17 – 22).

Claims 23 – 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Kyminas, et al. (U.S. 4,474,920). Kyminas, et al. teach an apparatus comprising: an embossing tool that includes: a tool substrate base (item 11 – figure 1); and means attached to the tool substrate base for providing a hardened embossing surface with reduced adherence properties to an embossable substrate (column 3, lines 20 – 35); wherein means for providing an embossable surface including a polymer film having attached thereto means for releasing the embossing tool, mixed with an epoxy resin (column 6, lines 40 – 45).

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 – 3 and 5 – 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over DePuydt, et al. in view of Ohman, et al. and further in view of Imatomi

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(U.S. 2006/0051453 A1). DePuydt, et al. teach the characteristics previously described but do not teach that the second and third base layers of the first coating are a metal oxide and metal nitride, specifically zirconium oxide and zirconium nitride nor does DePuydt, et al. teach the thicknesses of each layer. DePuydt, et al., however, do disclose the substrate with its multi-layered coating, such that the coating layers range in thickness from 10 – 200 nm. It is, therefore, known to one of ordinary skill in the art to apply metal or metal alloys in the formation of a substrate tool in layers and to ensure that such layers are very thin.

For example, Ohman, et al. teach the use of a three-layered substrate, comprised of a base metal layer, a thin layer of a second metal with good electrical characteristics, and a hard, wear-resistant layer, providing good release characteristics when contacted against the plastic element to be embossed (column 19, lines 15 – 25). The outermost wear-resistant layer consists of up to 5 micrometers (μm) of titanium nitride. In addition, Ohman, et al. teach that the respective layers should be fairly thin ($< 20 \mu\text{m}$ or between $2 - 10 \mu\text{m}$) to produce optimum results (column 18, lines 10 – 13). Furthermore, though the Applicant has claimed the specific thicknesses of $0.5 \mu\text{m}$ and $2 - 9 \mu\text{m}$, the Applicant has not introduced specific reasoning for utilizing such thicknesses. On the other hand, Ohman, et al. has stated that practically, very thin layers produce optimum results. Therefore, one of ordinary skill in the art would conclude that optimum results and higher quality substrates are produced with thinner layers.

Furthermore, in a method to manufacture a metal mold device, Imatomi teaches that components of the mold may be produced with layers (paragraph 0090), wherein there is a base layer, an inner layer and an outermost layer. The inner and outermost layers may be made of zirconium oxide and/or zirconium nitride among other metal compounds that may be used. The use of zirconium nitride and oxide provides good wear-resistant characteristics and toughness (paragraph 0091).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the layered substrate of DePuydt, et al. with the zirconium oxide and zirconium nitride layers of Imatomi, et al., and ensuring that the layers are very thin, as taught Ohman, et al. for the purposes of providing layers, with toughness and good wear-resistance as taught by Imatomi and producing optimum results as taught by Ohman, et al.

Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over DePuydt, et al. in view of Cheung, et al. (U.S. 6,210,514). DePuydt, et al. teach the characteristics previously described but do not teach that the second coating is comprised of polyparaxylylene.

In a method to fabricate thin film structures onto a substrate, Cheung, et al. teach the use of dielectric deposition of parylene C (paraxylylene), of 5 μm thick, onto the substrate (column 11, lines 35 – 37). The dielectric deposition of such a coating enhances moisture and chemical barrier properties of the finished assembly (column 11, lines 43 – 45).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to use paraxylylene as the cap layer or second coating in the multi-layered stamper of DePuydt, et al. for the purpose of maintaining the integrity and chemical properties of the patterning layer in the first coating.

Claim 12 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohman, et al. in view of Imatomi. Ohman, et al. teach the characteristics previously described but do not teach that the coatings are comprised of zirconium and zirconium nitride, respectively. Ohman, et al. do teach, however, that the base metal layer or substrate is coated with a thin layer of a second metal with good electrical characteristics, and a hard, wear-resistant layer, providing good release characteristics when contacted against the plastic element to be embossed (column 19, lines 15 – 25). The outermost wear-resistant layer consists of up to 5 micrometers (μm) of titanium nitride. In addition, Ohman, et al. teach that the respective layers should be fairly thin ($< 20 \mu\text{m}$ or between $2 - 10 \mu\text{m}$) to produce optimum results (column 18, lines 10 – 13).

In a method to manufacture a metal mold device, Imatomi teaches that components of the mold may be produced with layers (paragraph 0090), wherein there is a base layer, an inner layer and an outermost layer. The inner and outermost layers may be made of zirconium oxide and/or zirconium nitride among other metal compounds that may be used. The use of zirconium nitride and oxide provides good wear-resistant characteristics and toughness (paragraph 0091).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the layered substrate of Ohman, et al. with the zirconium oxide and zirconium nitride layers of Imatomi, for the purposes of providing layers with toughness and good wear-resistance as taught by Imatomi.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohman, et al. in view of Imatomi and further in view of Cheung, et al. Ohman, et al. and Imatomi teach the characteristics previously described but do not teach that there is a further coating comprised of polyparaxylylene.

In a method to fabricate thin film structures onto a substrate, Cheung, et al. teach the use of dielectric deposition of parylene C (paraxylylene), of 5 μm thick, onto the substrate (column 11, lines 35 – 37). The dielectric deposition of such a coating enhances moisture and chemical barrier properties of the finished assembly (column 11, lines 43 – 45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the multi-layered coated substrate of Ohman, et al. with the zirconium oxide and nitride layers of Imatomi to further include an outer layer of paraxylylene as for the purpose of maintaining the integrity and chemical properties of the patterning layer in the first coating.

Response to Arguments

16. Applicant's arguments filed October 10, 2006 have been fully considered but they are not persuasive. Regarding the objection of claim 2, Applicant has stated that claim 2 has been corrected, but it has not been corrected and remains the same as previously presented.

With respect to the prior art rejections, Applicant has argued that the reference of DePuydt, et al. do not teach an embossing tool substrate with a first coating over the first major surface of the substrate, the first coating providing an adherable surface; however, Examiner disagrees. DePuydt, et al. teach a substrate, which can be made of metal (column 7, lines 1 – 10), on which a dielectric layer is placed (item 44 – figure 4), of which the dielectric layer also serves to promote adhesion between the substrate and the patterning material (column 7, lines 40 – 45) and thus, the dielectric or first coating provides an *adherable surface*. The second coating over the first coating is the patterning material, which is comprised of the topmost layer or cap layer (column 7, lines 59 – 65). Applicant also argues that the coatings or layers of DePuydt, et al. are removed prior to completion of the finished substrate; however, even if such layers are removed prior to the finished product, *claim 1 does not claim a finished product or the point when the layers are placed on the substrate*. Claim 1, as written, is only claiming a substrate with a first coating and a second coating, and thus, the reference of DePuydt, et al. anticipates the claim.

With respect to the reference of Ohman, et al. and the rejection of claims 1 and 11, Examiner clarifies the structure of Ohman, et al. Ohman, et al. teach an embossing

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tool substrate (item 7 – figure 14), a first coating over the first major surface of the substrate, the first coating providing an adherable surface (item 41 – figure 14); and a second coating over the first coating, the second coating providing a non-adhesive outer surface (item 62 – figure 14). Thus, the reference of Ohman, et al. anticipates claim 1.

With respect to the rejection of claim 24, Applicant argues that Ohman, et al. do not teach a polymer film. Regarding this structural feature, Examiner agrees. Thus, the rejection of claim 24 with respect to the reference of Ohman, et al. has been withdrawn. However, in light of the newly-filed prior art cited by Applicant, Examiner has cited the reference of Kyminas, et al.

With respect to the 103 rejections of the subsequent dependent claims, Examiner maintains the rejections set forth in the previous Office Action. The prior art has shown that a substrate or matrix is fabricated with multiple layers, each layer providing a different function, the outermost layer typically fabricated of a material such that the substrate will not adhere to the stamper or embossing tool, allowing transfer of a pattern without wearing out either the stamper or the coating on the substrate. Inner layers typically function to promote strength and rigidity to the outermost layer. Thus, it would have been obvious to one of ordinary skill in the art to modify the substrate(s) of either Ohman, et al. or DePuydt, et al. with multiple layers such that strength and releasability of the substrate are maintained.

Conclusion

17. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Furthermore, Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on November 15, 2006 prompted the new ground(s) of rejection, with regards to claims 23 – 24, presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 609.04(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Veronica D. Ewald whose telephone number is 571-272-8519. The examiner can normally be reached on M-F, 8 - 4:30.

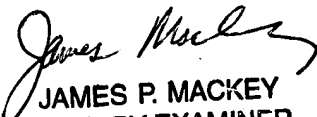
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Yogendra Gupta can be reached on 571-272-1316. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MVE


JAMES P. MACKEY
PRIMARY EXAMINER

12/11/06